Is a sustainable consumption pattern gradually emerging in Germany? Gradual changes in the sustainability of the consumption pattern analyzed by means of a consumer panel

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IS A SUSTAINABLE CONSUMPTION PATTERN GRADUALLY EMERGING IN GERMANY? GRADUAL CHANGES IN THE SUSTAINABILITY OF THE CONSUMPTION PATTERN ANALYZED BY MEANS OF A CONSUMER PANEL

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1. Introduction

When ways to activate a sustainable consumption pattern are discussed in the research literature and in political debates, implicitly or explicitly one or both of two main roads to this end is/are generally envisioned: the road of the small steps, where one may hope that one step leads to the next, and the detour via the main road of influencing general values and norms, where one hopes that the new values and norms lead to more reasoned life-style changes. Currently, the behavioural sciences are not able to provide scientifically based answers as to which road might be preferable, or whether a combination should be striven for. The main reason is that most research on environment and consumer behaviour has concentrated on studying behaviour within narrowly defined sectors. We even lack scientific knowledge about how individuals' propensities to behave in an environmentally friendly way in different domains or situations are related to each other. The international literature contains studies that report positive correlations between people's propensities to behave in an environmentally friendly way across domains (e.g., Berger, 1997) as well as studies that fail to find such correlations (e.g., Stern & Oskamp, 1987).

There are good arguments both for and against a hypothesis about interrelated propensities to behave in an environmentally friendly way in different situations. It is possible that environmentally friendly behaviour often requires knowledge or a willingness to seek information that are more prevalent in some people than in others. If this is true, these people would more often than others, everything else being equal, behave in an environmentally friendly way in any specific domain. A positive relationship across domains may

also have causes of a psychological nature. The hypothesis that environmentally friendly behaviour has a tendency to "spill over" into other behavioural domains (Frey, 1993; Thøgersen, 1999b) is backed by a group of psychological theories (especially Balance Theory and Dissonance Theory) that claim that we have a need to avoid inconsistencies in our beliefs, attitudes, and behaviours (Thøgersen, 1999a). Bem's (1972) Self-Perception Theory of attitude formation gives additional support to this hypothesis. This theory predicts that if a person starts behaving environmentally friendly in one area (e.g., separating one's waste for recycling), that person's attitudes and self-image might change in a way that increase his or her preparedness to behave environmentally friendly in other areas.

However, other arguments support the view that correlations between behaviours in different situations or domains are small, non-existing, or perhaps even negative. Environmentally friendly behaviour in specific settings is sometimes interpreted as an attempt of making amends (e.g., Wenke, 1993). It is claimed that people to some degree perform relatively easy environmentally friendly behaviours (like participation in a municipal recycling program) in order to make it easier to reject performing more demanding or costly behaviours (like biking to work instead of going by car) (Halkier, 1997). Some psychological theories also suggest mechanisms that may block the "spillover" between behavioural domains, for example Schwartz's (1977) Norm Activation Theory. This theory predicts that when the personal costs of behaving in a way that primarily benefits others or the society at large are perceived to be too high people tend, as a defence reaction, to post-rationalise the situation. People may neutralise the moral attitude or norm dictating pro-social behaviour by denying that continuing their current behaviour has any serious consequences or by denying their own responsibility for solving the problems produced by their current behaviour (Schwartz, 1968, 1973, 1977; Schwartz & Howard, 1980).

The primary objective of this paper is to detect whether, due to psychological mechanisms like those mentioned above interacting in a virtuous circle or for other reasons, environmentally friendly behaviours are spreading to more and more areas of the consumption pattern. An additional objective is to determine whether such a virtuous circle is facilitated if the individual possesses certain attitudes or values.

One may reasonably expect that spillover be facilitated if two product groups share the same environmentally relevant characteristic. More generally, spillover should be facilitated more the more common characteristics the product groups are perceived to have, i.e., the more likely it is that they are somehow categorised in the same mental category

(Thøgersen, 1999a; Thøgersen & Ölander, 1999). Hence, a third objective is to determine whether spillover is facilitated if the behaviours in question share common characteristics.

In order to reach these objectives, a research design that deviates from most previous studies of consumer behaviour in the environmental field is needed. Since the research questions concern evolution through time (changes in attitudes and behaviour), panel data are needed. By means of panel data it is possible to investigate whether consumers who behave environmentally friendly in area A today are more likely than others to behave environmentally friendly in area B tomorrow, which would indicate that a virtuous circle is operating. The study reported in this paper is based on household panel data from GfK (see specifications below). This data set makes it possible to study whether consumers who buy environment friendly products in one product category (e.g., beverages in returnable bottles) at one point in time are more likely than those who do not buy environment friendly products in other product categories (e.g., paper goods made of recycled fibres) later. Further, by classifying the consumption areas covered by the data according to shared characteristics; it is possible to see whether consistency in environment-friendly buying is facilitated by such similarities. In addition, attitude data connected with the panel data makes it possible to investigate whether certain attitudes or values facilitate environmentally friendly changes in behaviour. Hence the data set allows us to answer the questions implied by the objectives stated above with regard to this particular setting.

2. Data and method

Panel data

The empirical part of this study is based on a large consumer panel, GfK's Household Panel no. 1 for 1995, consisting of more than 4.000 German households who have filled out detailed shopping diaries on a continuous basis for a full year.[1] The panel data covers 57 product groups, each consisting of a number of specific products. In order to simplify the analysis and condense changes in the shopping pattern during the year covered by the data, the panel data set was divided in two, covering the first and the last six months respectively. Obviously, under normal circumstances deep and radical changes cannot be expected to happen over such a short time period. However, due to the fairly large sample size it is possible to detect the embryonic signs of changes that may significantly mark consumption patterns of the future. This paper represents a first attempt to use this type of data for a study of this type. Hence, in order not to complicate matters unnecessarily only

1 I am grateful to the Zentrum für Umfragen, Methoden und Analysen (ZUMA) in Mannheim, Germany, for making this data set available to me.

simple descriptive and correlation analysis tools are used. Broadly spoken, this panel is limited to packaged goods and beverages, including dairy products, but excluding fresh vegetables and meat. Three types of environment-relevant product characteristics are reported in the shopping diaries:

For two product groups - kitchen rolls and toilet paper - it is reported whether the product is "environment-friendly" or not. These products are coded as environment-friendly if their packaging is marked with an environment-label ("Der Blaue Engel") or with information stating that it is made of recycled fibres or is unbleached.

For one additional product group - coffee and tea filters - it is registered whether the product is bleached or unbleached (bleaching being environmentally harmful).

Environment-relevant packaging attributes are reported for 28 product groups. This category is by far the most heterogeneous and the only one of the three that needs further introduction.

Packaging data

A number of packaging attributes are perceived by consumers as environmentally relevant (Bech-Larsen, 1996; Thøgersen, 1996). Particularly, the German regulation as of 1991, mandating that packaging waste should be separately collected by producers (or their representatives), is likely to have increased the attention of German consumers towards this issue. However, it is not at all obvious what packaging attributes consumers perceive to be environment-friendly, and studies show that many German consumers are uncertain about this issue (e.g., Thøgersen, 1996). Thøgersen (1996) found that in 1992 the packaging material was the most important cue to a cream cheese packaging's environment-friendliness,[2] and that glass was considered the most environmentally friendly material followed by paper and cardboard, while plastic and aluminium were considered environmentally unfriendly. However, the degree to which consumers associate packaging material with environment-friendliness is bound to depend on a number of conditions, particularly the packaging traditions of the product group and the presence or absence of more unequivocal cues to environment-friendliness. As regards tradition, it is hard to imagine that consumers associate environment-friendliness to glass wine-bottles since glass bottles is the traditional and dominant way of packaging wine.[3] More unequivocal

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2 None of the more unequivocal cues to environment-friendliness mentioned below were available for cream cheese at this time.

3 If anything, the glass packaging here - as in a number of other cases - is presumably associated with high quality since wines that are filled in alternative packagings are generally of an inferior quality.

cues may be an environmental label, a "packaging free" system, a refill-system, or a return-and-reuse system (with or without a deposit). Again, the degree to which these cues are perceived as environment-relevant presumably depends on the packaging tradition within the product category (and which other associations the packaging form holds). In Germany, the presence of the "Green Dot" on most any packaging may have removed the importance of labels as a cue to the environment-friendliness of the packaging and may have made consumers even more uncertain about how to (and the need to) distinguish between packagings on this dimension. Table 1 lists the product groups in the GfK Household Panel 1 1995 where possible environment-relevant packaging attributes were registered. Below it will be explored whether German consumers perceive these product characteristics, as well as those mentioned earlier, as environment-relevant.

Information about possible environment-relevant packaging attributes are available for 28 of the 57 product groups covered by the Panel (not including wine and alcoholic beverages and a few other products nearly exclusively marketed in glass bottles or jars). The most common attribute is glass packaging (14 cases). In some of the included cases a glass packaging is probably not associated with environment-friendliness. Particularly, in cases where there are both one-way glass and returnable packaging options, it is assumed from the outset that only returnable bottles are perceived as environment-friendly. In 7 cases - all in the group of detergents and cleaners - it is registered whether or not a concentrated product is bought. Concentration clearly has implications for the amount of packaging, but may be preferred for other reasons as well (which is the case for most of these attributes). Perhaps the most unequivocal environmental attributes in the set are returnable (beverages and dairy products) and "refill" (detergents and cleaners and instant coffee) packagings.

Analytically, one may treat the environmental characteristics as dichotomous variables. However, one may suspect that it makes a difference with regard to the likelihood of spillover of environmentally concerned packaging choice between product groups whether or not the two groups share the same environmentally relevant characteristic (such as refill or concentrated). Still, in order to make the analyses more manageable, different kinds of returnable bottles (i.e., glass and plastic), different kinds of concentrated (referring to different levels of concentration as compared with the traditional standard), and different kinds of non-returnable glass packaging (i.e., bottles and jars) are aggregated.

Table 1: Product groups with environment-relevant packaging attributes

Product category	Label	Loose	Refill	Returnable	Glass	Concentrated
Windows, carpet and WC cleaners	W0					1
Tomato pure	W1				1	
Mayonnaise etc.	W2				1	
Detergent, low temp	W3		1			
Washing-up liquid	W4		1			1
Rough cleaner	W5					
Milk	W8	1		1	1	
Softener	W10		1			1
Tea	W18				1	
Universal cleaner	W21		1			1
Mustard	W23				1	
Floor maintenance	W28					1
Bath additives	W29		1			1
Potato products	W30	1				
Dessert	W31			1	1	
Beer	W33			1	1	
Juice	W36			1	1	
Soft drinks	W46			1	1	
Soft cheese	W47	1				
Linen starch etc.	W48		1			
Cream	W50			1	1	
Coffee whitener	W51				1	
Air freshener	W52		1			
Quark	W73			1	1	
Yoghurt	W78			1	1	
Hard cheese	W81	1				
Special cleaners	W82		1			
Mineral water	W84			1	1	
Number of cases		4	9	9	14	7

Attitude data

In October every year, members of GfK's consumer panels fill out a questionnaire with a large number of background, consumption related, and attitudinal questions. The questionnaire given to Household Panel no. 1 in October 1995 contained, among other things, 14 items measuring various aspects of environmental attitudes. Appropriate attitudinal

indices for the present study have been extracted from these 14 items by means of exploratory factor analysis and item analysis.

The exploratory factor analysis using all environment-related attitude items as input produced a three-factor solution (after applying the Kaiser-criterion). However, the three factors only account for 48% of the variance in the items, indicating that either the sample holds very heterogeneous perceptions of environmental issues or the instrument as a whole is not well suited to capture the common perceptions that exist.[4] All three factors, but particularly Factor 2, capture items that seem to reflect environmental concern in general. In addition, Factor 1 captures items seemingly reflecting denial.

Based on these factors, item analysis was performed with the aim of maximising the internal reliability of a general environmental concern and a denial construct. A three-item indicator seems to be the most reliable measure of general environmental concern, the three items being "when I buy cosmetics and household products I'm very attentive towards their environment-friendliness," "the protection of nature is more important than continued economic growth," and "I'm prepared to pay higher prices for environment-friendlier packaging." Cronbach's alpha for this instrument is .69, which is acceptable.

The items that seems suitable for measuring the inclination to deny responsibility for solving environmental problems ("denial" for short) are "the government and industry should take the first steps to protect the environment, not the ordinary citizens," "cars have nothing to do with environmental problems," and "I cannot do much to protect the environment in my household." Cronbach's alpha for a scale based on these items is only .48. However, the three items may still reflect a latent denial construct, but may do so in a formative (of various types of denial) rather than a reflective way. Indeed, the items arguably reflect three types of denial (of responsibility for, consequences of, and ability to solve environmental problems) that individuals may differ in their propensity to use. However, what really matter for behaviour is not which type or denial is preferred, but rather whether or not individuals have a propensity to fall back on denial in order to avoid making unpleasant sacrifices. As should be expected, there is a significant negative correlation ($r = -.31$, $p < .001$) between denial and environmental concern.

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4 The factor analysis results can be acquired from the author.

3. Analyses and results

3.1 Purchase frequency

This study is limited to the purchase of what is generally perceived as fast moving, "non-durable" or convenience goods. Still, the shopping diaries reveal that the frequency of buying these items varies a lot, both among consumers and among product categories (see Table 2). On average, these consumers buy milk nearly once a week and some does it every day. At the other end of the spectrum are a variety of household chemicals that the average household hardly buys once a year. Obviously, the volume of consumption and, hence, also of resource use, waste, and a number of other environmental impacts are positively correlated with purchase frequency, meaning that high-frequency product categories also should be the target of the highest concern. At the same time, the likelihood of developing a habitual shopping pattern increases with the behavioural frequency (Ouellette & Wood, 1998), meaning that environmentally harmful (but also environmentally beneficial) behaviour patterns are more difficult to change the higher the behaviour frequency. I will return to this issue later.

3.2 Consumers‘ propensity to choose environment-friendly

German consumers' propensity to choose the environment-friendly option within a product category is measured as the proportion of purchases in the product category that have one of the environment-friendly attributes mentioned earlier. For most products, only one environment-relevant attribute is registered (environmental label, unbleached, returnable bottle, concentrated, etc.), but in three cases two attributes are registered (concentrated as well as refill packaging). In these cases, the propensities to choose products with each of these characteristics are calculated separately. Table 3 shows the propensity to choose environment-friendly regarding each of the studied product categories in the first and the last half of 1995. The stability of each propensity over the year, measured as Pearsons *r* and including only consumers who purchased the product in both halves of the year, is also shown.

German consumers' average propensity to choose (what is here assumed to be) the most environment-friendly option varies tremendously among these 31 product types, from (practically) 0 (potato products in lose weight and desserts in a returnable glass packaging) to about 90% (unbleached coffee and tea filters) of the purchases. The variation is practically unchanged between the first and the second half of 1995, and so is the rank order of the propensities to choose environment-friendly in the different product groups (Spearman's rank correlation = .95).

Table 2: Buying frequencies[1] in the studied product groups in first and second half of 1995. N = 4426

Product category	Label	Mean t1	Std Dev t1	Min t1	Max t1	Mean t2	Std Dev t2	Min t2	Max t2
Floor maintenance	W28	0.30	0.81	0	18	0.24	0.69	0	11
Air freshener	W52	0.31	1.17	0	19	0.30	1.14	0	17
Special cleaners	W82	0.35	0.83	0	9	0.38	0.85	0	10
Linen starch etc.	W48	0.40	0.99	0	19	0.37	0.98	0	17
Kitchen rolls	W32	1.17	1.85	0	23	1.20	1.87	0	20
Rough cleaner	W5	1.22	1.88	0	44	1.18	1.86	0	47
Detergent, low temp	W3	1.33	1.86	0	24	1.20	1.72	0	21
Filter paper	W75	1.45	1.63	0	25	1.41	1.59	0	26
Windows, carpet, and WC cleaners	W0	1.47	1.99	0	23	1.45	1.97	0	21
Softener	W10	1.71	2.55	0	27	1.60	2.46	0	29
Mustard	W23	1.72	2.11	0	23	1.68	2.11	0	22
Bath additives	W29	1.91	2.68	0	42	2.02	2.77	0	37
Washing-up liquid	W4	1.98	2.23	0	25	1.94	2.13	0	26
Potato products	W30	2.16	3.59	0	52	1.93	3.49	0	52
Mayonnaise etc.	W2	2.30	3.30	0	40	2.29	3.27	0	39
Universal cleaner	W21	2.33	2.57	0	29	2.23	2.44	0	28
Tomato pure	W1	2.82	3.88	0	50	2.71	3.82	0	50
Toilet paper	W99	3.65	3.65	0	47	3.68	3.63	0	51
Dessert	W31	3.97	7.55	0	83	3.58	7.02	0	67
Tea	W18	4.53	5.93	0	71	4.23	5.54	0	69
Coffee whitener	W51	6.00	6.64	0	46	5.89	6.61	0	44
Beer	W33	7.02	10.44	0	96	7.28	10.65	0	153
Soft drinks	W46	7.96	13.91	0	150	8.88	14.53	0	182
Cream	W50	8.52	9.06	0	75	8.20	8.91	0	78
Mineral water	W84	9.68	10.15	0	130	10.04	10.31	0	115
Juice	W36	10.73	14.16	0	168	9.80	12.93	0	133
Hard cheese	W81	11.07	13.20	0	114	10.79	12.71	0	103
Quark	W73	11.24	11.11	0	112	10.13	10.56	0	110
Yoghurt	W78	14.29	15.48	0	156	12.66	14.29	0	154
Soft cheese	W47	16.63	15.77	0	208	15.92	15.38	0	208
Milk	W8	23.01	23.27	0	189	23.15	23.99	0	209

[1] The buying frequency is the number of purchases in the product category in six months.

Table 3: The propensity to choose environment-friendly options in the studied product groups in first and second half of 1995

Product category	Label[1]	Mean t1	Std Dev t1	N t1	Mean t2	Std Dev t2	N t2	r t1-t2	N
Potato products	W30	0.00	0.04	2380	0.00	0.05	2278	0.58	1835
Dessert	W31	0.00	0.04	2318	0.00	0.03	2181	0.42	1827
Quark	W73	0.01	0.06	3929	0.01	0.04	3818	0.30	3667
Cream	W50	0.02	0.11	3625	0.02	0.11	3557	0.67	3347
Windows, carpet, and	W0	0.03	0.15	2585	0.05	0.19	2598	0.20	1975
Tea	W18	0.04	0.15	3258	0.06	0.18	3170	0.49	2784
Air freshener	W52	0.04	0.17	479	0.04	0.17	472	0.03[2]	247
Floor maintenance	W28	0.05	0.22	897	0.05	0.20	776	0.33	362
Bath additives	w29	0.05	0.18	2713	0.07	0.20	2751	0.55	2170
Linen starch etc.	W48	0.05	0.20	1016	0.06	0.21	908	0.54	544
Yoghurt	W78	0.08	0.20	3830	0.08	0.20	3783	0.72	3584
Soft cheese	W47	0.09	0.18	4059	0.09	0.18	4004	0.68	3894
Milk	W8	0.09	0.23	4097	0.08	0.22	4075	0.86	3987
Special cleaners	W82	0.11	0.29	974	0.11	0.29	1079	0.48	504
Coffee whitener	W51	0.13	0.29	3333	0.13	0.29	3285	0.73	3006
Washing-up liquid	W4R	0.14	0.29	3283	0.13	0.28	3264	0.49	2740
Kitchen rolls	W32	0.15	0.32	2244	0.14	0.31	2284	0.46	1723
Detergent, low temp	W3	0.15	0.30	2492	0.20	0.35	2327	0.52	1756
Rough cleaner	W5	0.21	0.35	2393	0.29	0.39	2412	0.38	1685
Juice	W36	0.28	0.35	3746	0.29	0.36	3706	0.68	3436
Hard cheese	W81	0.30	0.36	3746	0.28	0.35	3722	0.78	3516
Softener	W10C	0.31	0.39	2573	0.05	0.20	2499	0.29	2029
Softener	W10R	0.34	0.40	2573	0.37	0.41	2499	0.53	2029
Toilet paper	W99	0.41	0.42	3784	0.41	0.42	3784	1.00	3784
Mayonnaise, etc.	W2	0.49	0.42	2720	0.53	0.42	2662	0.55	2182
Washing-up liquid	W4C	0.50	0.43	3283	0.60	0.41	3264	0.46	2740
Universal cleaner	W21R	0.51	0.42	3380	0.61	0.42	3366	0.53	2881
Tomato pure	W1	0.59	0.39	2952	0.61	0.40	2888	0.49	2403
Soft drinks	W46	0.61	0.40	3040	0.57	0.40	3204	0.70	2728
Universal cleaner	W21C	0.65	0.41	3380	0.45	0.41	3366	0.33	2881
Mustard	W23	0.68	0.41	2903	0.68	0.41	2843	0.62	2280
Beer	W33	0.77	0.35	3276	0.76	0.35	3309	0.71	2956
Mineral water	W84	0.86	0.30	3911	0.86	0.29	3952	0.83	3754
Filter paper	W75	0.91	0.26	2802	0.90	0.26	2760	0.51	2330
Average		0.28		2882	0.28		2848	0.54	2458

[1] The suffix R in a label means returnable or refillable packaging. C means concentrated.

[2] Not significant at $p < .05$. All others are significant at $p < .001$.

The data set makes it possible to calculate two summary indicators that may be used to evaluate changes in the overall propensity to choose environment-friendly options when buying the studied products. One may count the number of product groups where individual consumers have chosen an environment-friendly option in the covered time periods. This measure can be used as an indicator of the *breadth* of environment-friendly buying which is central to the spillover ideas mentioned in the introduction. The average breadth indicator for the first six months is 10.05 and for the last six months it is 10.77. The increase is marginal, but statistically significant ($t = 19.44$, d.f. = 4425, $p < .001$).

Further, one may calculate the simple average of the propensities to choose environment-friendly in the studied products groups. This measure may serve as an indicator of the *depth* of environment-friendly buying in the areas where people choose environment-friendly. The depth indicator for the first and second half of 1995 is shown in Table 3. According to this indicator, the overall propensity to choose environment-friendly has not changed during this year.

3.3 The stability of environment-friendly choice

The stability of environment-friendly choice in each product group is calculated as the Pearson correlation between individual consumers propensity to choose the most environment-friendly option in the first and the second half-year. In all cases except one, correlations between propensities to choose the environment-friendly option are significant and positive. The exception is the most infrequently bought item in the set, air freshener, where the environment-friendly attribute is a refill container. Besides this case, correlations vary from weak ($r = .29$, concentrated textile softener) to perfect ($r = 1$, environment-labelled toilet paper). The average stability is .54. Hence, the propensity to choose environment-friendly consumer goods (or not) seems to be characterised more by stability than by change. This is hardly a surprise, especially when the time-span is as short as in the present case.

Behavioural stability, particularly in areas like the one studied here, is typically attributed to habitualisation (e.g., Ouellette & Wood, 1998), although it is acknowledged that it may have other causes as well (such as stable preferences, cf., e.g., Ajzen, 1991). Habitualisation depends on the behaviour being performed at a high frequency (Ouellette & Wood, 1998). Hence, if (part of) the reason why practically all correlations reported in Table 3 are significant and positive is that consumers tend to buy whatever they buy (environment-friendly or not) habitually, the correlation between past and future behaviour should depend on the purchase frequency. This prediction may be tested by analysing the correlation between purchase frequency, reported in Table 2, and the stability of environment-friendly choice (the correlation between environment-friendly choice in the first and

second half of 1995), reported in Table 3. The correlation between average purchase frequency (calculated for the whole year) and the stability of environment-friendly choice in the product categories is indeed significant and positive (r = .57, d.f. = 30, p = .001), thus supporting the suggestion that habitualisation is among the causes of the stability of the propensity to choose environment-friendly (or not). However, that it is also partly due to stable preferences can be seen by comparing the stabilities in those product areas where the environment-friendly purchase frequency is significantly correlated with the index of environmental concern (average stability .58, see Table 4) and those where it is not (average stability .50). The difference is statistically significant, p < .001. Hence, the stability of the propensity to buy environment-friendly is highest in areas where the environment-friendly attribute is recognised as such.

3.4 The perceived environmental relevance of these choices

To the degree that consumers' choice of an environment-friendly option is at least partly voluntary, it matters whether or not they perceive differences between options to be environment-relevant. Whether they do that in the cases studied here is not registered in either GfK's panel data or in the accompanying survey. However, if we accept the assumption that consumers are more likely to favour an option that they perceive as environment-friendly the more environmentally concerned they are, the correlation between a measure of environmental concern and the propensity to choose a product with an alleged environment-friendly attribute can be used as a rough indicator of whether or not the attribute is conceived as environment-relevant by consumers (see Table 4).

In absolute terms, none of the correlations that are reported in Table 4 are impressive. This is as should be expected when a general attitude measure is correlated with such specific behaviour measures (Ajzen & Fishbein, 1977; Weigel & Newman, 1976). In order to illustrate the importance of correspondence for the attitude-behaviour correlation, an aggregate index of the propensity to choose environment-friendly in these product areas has been calculated. The last row of Table 4 shows that this index correlates more strongly with environmental concern than any of the individual items.[5, 6]

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5 The purchase of convenience goods is still a very narrow behavioural category compared to the measure of environmental concern. Hence the fairly low correlation.

6 In order to further substantiate the claim that the propensity to choose the options in focus here is related to their perceived environmental relevance, the correlation between the denial index and the aggregate propensity was also calculated. The correlation is statistically significant with the expected direction (r = .12, p < .001).

Table 4: The correlation between general environmental concern[1] and the propensity to choose an environment-friendly version of various convenience goods

Product area	Label	r	N	p
Softener	W10K	0.049	1902	0.034
Tomato pure	W1	0.027	1902	0.244
Soft drinks	W46	0.011	3272	0.539
Softener	W10R	0.009	3410	0.590
Tea	W18	0.004	3208	0.804
Detergent, low temp	W3	-0.010	2873	0.594
Potato products	W30	-0.011	2635	0.559
Rough cleaner	W5	-0.012	2934	0.525
Quark	W73	-0.022	3815	0.174
Windows, carpet and WC cleaners	W0	-0.023	2990	0.210
Linen starch etc.	W48	-0.025	1308	0.361
Coffee whitener	W51	-0.026	3369	0.127
Bath additives	w29	-0.029	3084	0.108
Dessert	W31	-0.032	2510	0.104
Mayonnaise etc.	W2	-0.034	3008	0.066
Special cleaners	W82	-0.038	1448	0.153
Mineral water	W84	-0.043	3832	0.008
Mustard	W23	-0.045	3244	0.011
Cream	W50	-0.045	3587	0.007
Washing-up liquid	W4R	-0.048	3556	0.004
Hard cheese	W81	-0.051	3691	0.002
Beer	W33	-0.056	3387	0.001
Juice	W36	-0.057	3751	0.000
Kitchen rolls	W32	-0.068	2636	0.000
Universal cleaner	W21R	-0.072	3612	0.000
Washing-up liquid	W4K	-0.074	3556	0.000
Universal cleaner	W21K	-0.075	3612	0.000
Floor maintenance	W28	-0.077	1229	0.007
Filter paper	W75	-0.077	3018	0.000
Soft cheese	W47	-0.084	3896	0.000
Milk	W8	-0.087	3904	0.000
Air freshener	W52	-0.102	659	0.009
Yogurt	W78	-0.106	3761	0.000
Toilet paper	W99	-0.147	3774	0.000
All product areas		-0.149	4121	0.000

[1] Measured on an index going from 3 (highest) to 15 (lowest).

Significant, but weak correlations found in studies based on large samples are often discounted based on the argument that had the sample size not been large they would not have reached significance. This is an appropriate careful way of reasoning in cases where the correlation has a weak theoretical backing. However, in cases, such as the present, where there are sound theoretical reasons to expect a correlation, and also that the correlation is bound to be weak, significant, but weak, correlations cannot be discounted with reference to the sample size. On the other hand it is a strong message when a correlation does not reach significance in spite of a large sample size, which is the case in 14 of the 34 cases analysed in Table 4. In one additional case, the correlation is significant, but with the wrong sign. Hence, in 15 cases product attributes that are technically environment-relevant seem not to be perceived as such by the consumers. Many of these cases are infrequently bought household chemicals and speciality foods, but there are also more frequently bought products among them, such as soft drinks, tea, and coffee whitener. In 19 cases is the correlation between the choice of an environment-friendly option and environmental concern statistically significant and in the right direction.

3.5 The breadth and depth of buying environment-friendly in areas perceived as environment-relevant

If only those product areas where the propensity to choose environment-friendly is significantly correlated with environmental concern are counted in, the average breadth indicator (mentioned above) for the first six months is 7.06 and for the last six months it is 6.74. The decrease is marginal, but statistically significant (t = -10.37, d.f. = 4425, $p < .001$). If the same procedure is used for calculating the depth indicator (mentioned above), it falls from .36 in the first to .34 in the second half of 1995. The difference is not statistically significant (z = .898), however.

3.6 Consistency in environment-friendly purchases across products

The key question, raised when motivating this study, is whether consumers are consistent in their propensity to choose environment-friendly options in different product groups. It was suggested that, due to spillover, consistency should be expected to increase over time. In addition it was suggested that the (increase in) consistency may depend on perceived similarities between the product (or behavioural) categories and on whether or not the consumer holds certain environment-relevant attitudes. In order to test these propositions, correlation analyses have been performed focusing on propensities to choose environment-friendly options in different product categories. The focus is not on the individual bivariate correlations, but on aggregates produced by averaging over groups of products, or more precisely over bivariate correlations between environment-friendly purchases of products in the group. Such analyses have been made for the total sample as well as for

sub-samples, where the score on the environmental concern and denial indexes have been used to split the sample (see Table 5).

Table 5: Average correlations between propensities to choose environment-friendly options in different product categories in the first and last six months of 1995

	All		Products where propensity to buy environment-friendly correlates with environmental concern									
			All		Low concern		High concern		Low denial		High denial	
	t1	t2	t1	t2	t1	t2	t1	t2	t1	t2	t1	t2
Total	0.03	0.03	0.04	0.04	0.03	0.02	0.05	0.04	0.04	0.05	0.04	0.03
Packaging												
Loose	0.18	0.20	0.49	0.48	0.45	0.46	0.51	0.50	0.51	0.50	0.46	0.47
Return	0.11	0.11	0.15	0.15	0.12	0.13	0.16	0.16	0.16	0.17	0.13	0.12
Refill	0.04	0.04	0.03	0.02	0.06	0.02	0.01	0.00	0.00	0.02	0.06	0.01
Glass	0.00	0.01										
Concentrated	0.01	0.02	0.02	-0.01	0.03	0.00	0.02	-0.01	0.03	-0.01	0.01	0.00
Green label	0.14	0.17	0.14	0.17	0.21	0.17	0.14	0.17	0.20	0.19	0.14	0.15
Product category												
Detergents and cleaners	0.04	0.03	0.07	0.04	0.08	0.05	0.06	0.04	0.07	0.03	0.07	0.06
Cheese	0.49	0.48	0.49	0.48	0.45	0.46	0.51	0.50	0.51	0.50	0.46	0.47
Dairy products	0.14	0.16	0.19	0.19	0.12	0.13	0.21	0.22	0.23	0.22	0.12	0.14
Beverages	0.22	0.22	0.20	0.19	0.19	0.18	0.20	0.20	0.20	0.21	0.19	0.17
Paper goods	0.09	0.09	0.09	0.09	0.11	0.08	0.10	0.09	0.13	0.11	0.08	0.07
Dressings	0.00	0.00										

Note: Differences between correlations larger than NN are significant, $p < .05$.

Focusing first at the most aggregate level, Table 5 shows the average of correlations between different propensities to buy environment-friendly, calculated both for all covered cases and for only those cases where the propensity is significantly correlated with environmental concern. Consistent with the suggestion that consistency depends on environmental concern and the perceived environmental relevance of the options, the average correlation is highest in the latter case and only in this case it is (marginally) statistically significant (d.f. ≈ 2,300). However, the difference between the correlations is not significant at this level of aggregation. Neither does the aggregate correlation change between

the two time periods. Hence, judged at this level of aggregation the behaviour of German consumers seems neither to be particularly consistent, nor to be in a process towards a higher level of consistency. On this level of aggregation, when the sample is split according to environmental concern or denial (in those scoring below and those scoring above the sample mean of each index), differences between sub-samples have the expected sign (high concern and low denial seeming to facilitate greater consistency), but they are not statistically significant.

In most cases, the consistency becomes quite a bit higher when the focus is narrowed to product categories that share more common characteristics. Exceptions are a category where the common characteristic is the material of the packaging (glass) and a category of speciality foods (dressings). In neither of these categories is more than one purchase behaviour significantly related to environmental concern. Consistency in choice is also absent regarding the purchase of refills and concentrated products (two options that are limited to detergents, cleaners, and the like). Those among these purchase behaviours that are related to environmental concern tend to be so relatively weak.

The strongest average correlation among packaging choices regarding different products concerns "loose weight" and the strongest one among environment-friendly choices within product categories concerns (different types of) cheese. When only purchase behaviours that are significantly correlated with environmental concern are counted in, the loose weight and the cheese categories boil down to the same thing. Obviously, there are a lot of common characteristics among the purchases of different kinds of cheese in loose weight, including that they are often bought in the same speciality store or speciality counter in the supermarket. Table 4 shows that the propensity to choose cheese in loose weight is correlated with environmental concern, but of course, other factors may play an even bigger role. Average correlations are also relatively high for the choice of returnable packaging and for choosing beverages and dairy products (other than cheese) in environment-friendly packaging. The same is the case for the choice of environment-labelled products and paper goods (the environment-labelled products plus filters). In all these cases (where it is relevant) except one, the average correlation improves when behaviours that are not significantly correlated with environmental concern are removed. Further, in all of these cases, except for the purchase of paper goods and environment-labelled products (i.e., also part of the paper goods category), environmental concern makes a significant difference (except for beverages) for the level of consistency in behaviour. The inclination to denial makes an equally significant difference in the same cases and also for the purchase of environment-labelled products and paper goods. However, no tendency to increased consistency (or the reverse) over time can be detected in either of the categories or (sub-) samples.

4. Summary and implications

The key question motivating this paper is whether or not environmentally friendly behaviours are spreading to more and more areas of the consumption pattern. The answer to this question, and answers to follow up questions about conditions for and determinants of such a tendency, are of utmost importance for strategies aimed at facilitating a more sustainable consumption pattern. The conditions in focus in this paper are individuals' possession of certain attitudes or values and the degree to which product or behavioural categories share the same environmentally relevant characteristics.

The main conclusions are:

There are mixed evidence as to whether the breadth of environment-friendly buying by German consumers expanded or contracted over the studied time period (one year). In all cases, the change was marginal. Overall, the depth or intensity of environment-friendly buying inside product areas did not change.

The propensity of German consumers to shop in an environment-friendly way is highly stable within most product areas. The stability is positively correlated with the purchase frequency of a product, indicating that it is at least partly due to habit. However, the stability also depends on the perceived environmental relevance of the choice, indicating that it is partly due to stable preferences.

The propensity of German consumers to shop in an environment-friendly way is far from consistent across (convenience) product areas overall. However, the consistency is higher within areas that seem to be perceived as environment-relevant and more so among purchases that share many than among those sharing few common characteristics.

Environmental concern seems to facilitate and an inclination to denial seems to reduce consistency.

The level of consistency did not change over the studied time period.

As regards the key question, the cross-sectional and the time-series evidence from this study points in opposite directions. The study finds no clear signs of environment-friendly behaviour spreading to more areas of the consumption pattern over time. Here, the overwhelming evidence points towards stability rather than change. On the other hand, the cross-sectional evidence indicates that under the right conditions consumers tend to be consistent in their propensity to shop in an environment-friendly way. Hence, it follows that environment-friendly behaviour must have spread between different areas of the consumption pattern when these conditions were present. The conditions identified to influence consistency – and, hence, the spread or spillover of a propensity to shop in an

environment-friendly way – are perceived environmental relevance, common characteristics (i.e., perceived similarity) between areas, environmental concern, and an inclination to denial (negative influence).

Although seeming contradictory, these results can be reconciled in the conclusion that a tendency for environment-friendly behaviour to spread to more and more areas of the consumption pattern apparently exists, but under conditions similar to those existing in Germany in the middle of the 1990's it is so weak and slow that it is not traceable in time-series data covering a period of just one year. From this follows a number of implications. Research-wise it suggests that an attempt should be made to replicate this study using a longer timeframe. Policy-wise attempts should be made to identify conditions that facilitate and conditions that hamper the spillover of environment-friendly behaviour. This study suggests that consumers insufficient understanding of the environmental relevance of choices they make, and perhaps also of the similarity of environmentally relevant characteristics across product and behavioural areas, are among the barriers to sustainable consumption. Such barriers could be targeted with specific educational programmes. The study also suggests that more basic attitudes and personality traits influence consumers propensity to adopt a more sustainable consumption pattern. Specifically, this propensity is facilitated by a high level of environmental concern and hampered by an inclination to deny ones responsibility. Attitudes and personality traits like these are presumably built over a long period of time and should be targeted by a broad based long run education and socialization effort at all levels of society, but with the family and in the education sector being key agents of change.

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